Cash Transfers, Mental Health, and Agency: Evidence from an RCT in Germany*

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PRELIMINARY – UPDATE COMING SOON

Abstract

Basic income—a regular, guaranteed, and unconditional cash transfer—promises to improve the lives of recipients. Contemporaneous research, however, suggests limited scope for subjective well-being improvements in high-income countries, based on small to medium-sized cash transfer programs. We conducted a preregistered randomized controlled trial in Germany to study the effect of a generous cash transfer program on recipients' self-reported well-being. Treated participants received monthly cash transfers of EUR 1,200 for three years. Cash transfers improved mental health by 0.347 standard deviations, purpose in life by 0.250 SD, and life satisfaction by 0.417 SD. These effects are large and robust to multiple hypothesis testing adjustments. Improvement in life satisfaction extends across various domains, including financial, health, sleep, leisure, and work satisfaction. Treatment effects stay constant over time for most outcomes, except that the effect on financial satisfaction decreases, and the effects on purpose of life and work satisfaction increase. Furthermore, the improvements even extend to six months after the end of the cash transfer program. In additional analyses, we show that cash transfers increase perceived autonomy, monthly savings, donations to charitable causes, financial transfers given to family and friends, time spent with friends, recreational spending, and sleeping time. This is consistent with statements of treated participants, suggesting that the cash transfers enabled life changes, in addition to increasing financial security. Our findings suggest that cash transfer programs can lead to lasting well-being improvements if they are regular, guaranteed, unconditional, and generous enough to empower agency and life changes.

Introduction

Basic income is a prominent proposal in debates about the future of welfare states of high income countries, and promises to increase inclusivity and security and to reduce conditionality of

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welfare systems.[1,2,3,4] Basic income is unconditional, paid regularly, does not involve surveillance or control from authorities, provides an outside option relative to other income sources, is less associated with stigma, and ultimately reduces uncertainty about future income due to the guaranteed continuation of cash transfers. Basic income may ease financial constraints and improve autonomy, and may thereby improve the subjective well-being of recipients, a key outcome in evaluations of public policies[5,6,7,8,9,10,11,12,13,14] which has been shown to correlate with societies' economic development, social coherence, healthy life expectancy, and freedom of choice.[15]

Despite growing interest, empirical evidence concerning the effect of basic income on recipients' subjective well-being in high income countries remains scarce. While we lack direct experience with actual basic income policies, contemporaneous research makes important progress by studying unconditional cash transfer programs.[16,17,18,19,20] Intriguingly, these studies find no evidence for durable improvements in subjective well-being. However, extrapolating from these cash transfer programs is challenging. While basic income proposals imply substantial cash transfers to each household member over the entire lifespan of recipients, the studied cash transfer programs were much less generous, temporarily improving annual household income by 1-40%.

In this paper, we present evidence from a generous unconditional cash transfer program that we implemented in Germany in the form of a preregistered randomized controlled trial. The treatment group received monthly payments of EUR 1,200 for a total of three years. Cash transfers increased baseline annual household income by 46% to 110%. Participants of the treatment group (N=107) and control group (N=1,580) completed semi-annual surveys on their mental health[21], purpose in life (eudaimonic well-being)[22,23,24], and life satisfaction[25] over the course of the study period. We used a stratified randomized experimental design for treatment assignment, which allows us to obtain precise estimates of the causal effect of cash transfers on these measures of well-being. Cash transfers improve mental health by 0.347 standard deviations (Fisher's exact p-value<0.001[26]), purpose in life by 0.250 SD (p-value<0.01), and life satisfaction by 0.417 SD (p-value<0.001) during the study period. These effects are relatively large, robust to preregistered multiple hypothesis adjustments, and unlikely to be the result of experimenter demand[27] or Hawthorne effects[28].

We document four additional findings. First, we find that improvements in life satisfaction take place across several domains. Financial satisfaction improves substantially, but we also observe greater satisfaction with health, sleep, leisure, and work. Second, we find little evidence for temporal adaptation (i.e., declining treatment effects) during the study period. Treatment effects are mostly constant, except that improvements increase over time for purpose in life and work satisfaction, and decrease for financial satisfaction. Third, mental health, purpose in life, and life satisfaction improvements extend to six months after the end of the cash transfer program at, on average, 81% of the effect size during the cash transfer program. Fourth, treated participants stated that the cash transfers not only improved their financial security (stated by 72% of treated participants), but also allowed them to choose more freely (25%) and change

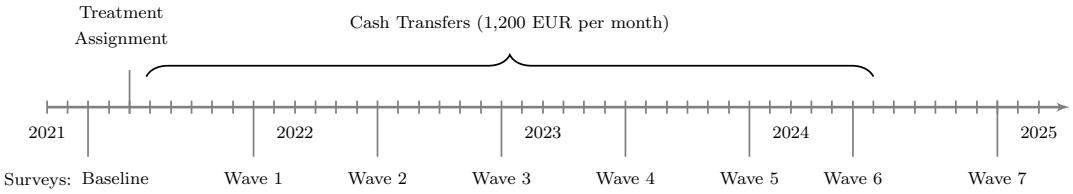

Figure 1: Timeline of the RCT

their lives in terms of work and education (37%), leisure activities (38%) and their ability to help others (63%). Consistent with this, we find positive cash transfer effects on perceived autonomy, monthly savings, donations to charitable causes, financial transfers given to family and friends, time spent with friends, recreational spending, and sleeping time. Importantly, there is amply evidence that mental health and well-being benefit from greater financial security [29,30], prosocial behavior [31,32], social connectedness [33,34,35], sleep and recreational activities [36,37], and autonomy [38,39]. We hence view the patterns of life changes mentioned above to provide suggestive evidence on the mechanisms behind the mental health and well-being improvements.

In contrast to contemporaneous evidence that small to medium-sized cash transfers in high income countries do not lead to durable improvements of well-being, [16,17,18,19,20] we find that cash transfers *can* lead to lasting improvements of well-being if they are generous enough to enable life changes. Most directly comparable to our RCT, [18,19,20] evaluate a cash transfer program of monthly payments of USD 1.000 for a total of three years in the US. [18] do not find a positive treatment effect on mental health, and rule out improvements greater than 0.028 SD in their setting. Beyond the main difference that we find large mental health improvements (0.345 SD) in our setting, there are additional differences. We find that cash transfers empower recipients to implement and experience life changes that—as suggested by the related literature that we summarized above—support mental health and well-being improvements. [18], however, report that their cash transfers do not have equivalent effects on their recipients. Instead, [19,20], who study the time-use and household finance effects of the US cash transfer program studied in [18], report much smaller effects on monthly savings, donations, and financial support to others, and they do not find positive effects on time spent with friends and sleeping time. We hence conclude that cash transfers need to be generous enough to empower recipients to implement and experience the changes in their lives that lead to enduring mental health and well-being improvements. We also contribute to the broader literature on the effect of money on well-being, [5,23,40,41,42,7,8,43,44,45,46,11,25,47,48,49,50,24,51,52,53] by documenting the potential of regular, guaranteed, and unconditional cash transfers for well-being improvements.

Cash Transfers RCT

Setup We estimate the causal effect of a regular, guaranteed, and unconditional cash-transfer program on recipients' well-being in a preregistered randomized controlled trial in Germany.

The German NGO "Mein Grundeinkommen e.V.", which is funded through private donations, financed the cash transfers. Prior to the RCT, Mein Grundeinkommen made regular cash transfers of EUR 1,000 per month for a single year—which are not evaluated in this paper—to 818 randomly assigned applicants, making Mein Grundeinkommen a credible partner to finance the basic income in our RCT.

We preregistered the design of the RCT at `https://www.socialscienceregistry.org/trials/7734`, and discuss the design in detail in the supplementary materials. We highlight the main design features in the following, and display an overview of the timeline in Figure 1.

We advertised the RCT in a public call in August 2020. 2,048,370 applicants registered online and submitted minimal socio-economic information. Based on this information and eligibility criteria, we constructed a baseline sample of 20,000 applicants. Applicants were eligible if, at baseline, (i) they were between 21 and 40 years of age, (ii) had a personal, monthly income between EUR 1,100 and 2,600, (iii) were not unemployed for more than one year (if at all) and (iv) lived in households of size one. Eligibility criteria (i)-(iii) ensured comparability to contemporaneous cash-transfer studies[18,19,20], (iii) also implied that our cash transfers would not reduce potential longterm unemployment benefits of recipients, and (iv) ensured that our cash transfers were more generous than in other cash-transfer studies[18,19,20].

The baseline sample then completed a more comprehensive baseline survey. Thereafter, we constructed our study sample and employed a stratified randomized treatment assignment based on participants' responses to the baseline survey, see the supplementary materials. Our study sample includes 1,687 participants, 107 are treated and 1,580 are in the control.

Treated participants received tax-free cash transfers of EUR 1,200, paid monthly, over the course of three years. There were no conditions attached to receiving the cash transfers, apart from completing seven semi-annual online surveys. Members of the control group did not receive cash transfers, and were asked to complete the same seven semi-annual surveys. For every completed survey, control participants received an incentive payment of EUR 10, plus an additional payment of EUR 30 if they completed all seven surveys. This allowed us to limit attrition (see the supplementary material). A professional survey provider implemented the surveys and was in contact with the participants, which ensured that participants were not in direct contact with Mein Grundeinkommen and allowed us to limit experimenter demand effects. We present evidence below suggesting that demand effects are unlikely to account for our findings.

We surveyed participants' mental health, purpose in life, and life satisfaction in all waves. The wording of all questions is stated in the supplementary material. We elicited mental health via the WHO-5 well-being index, a screener for depression[54], and the PSS stress scale[55]. For purpose in life and life satisfaction, we adopted measures as used in the German Socio Economic Panel, SOEP[56]. We measured purpose in life via the single item that asks participants how meaningful and valuable their life is. We elicited general life satisfaction, as well as six specific domain satisfactions: income, sleep, health, social life, work, and leisure. Note that the WHO-5 depression questions and general life satisfaction are missing for wave 1, and the PSS stress questions are missing for wave 2.

Outcome	Treated	Control	ATE	SE	t-stat	p-val (N)	p-val (F)	n treated	n control
Aggregates									
Mental Health	0.354	0.007	0.347	0.088	3.939	0.000	0.000	107	1418
Purpose in life	0.116	-0.134	0.250	0.087	2.888	0.004	0.006	107	1476
Life Satisfaction	0.316	-0.101	0.417	0.082	5.061	0.000	0.000	107	1436
Aggregate components									
WHO-5 Depression	0.355	0.035	0.320	0.078	4.090	0.000	0.000	107	1445
PSS Stress	0.240	-0.039	0.279	0.083	3.377	0.001	0.000	107	1470
Domain Satisfaction Index	0.303	-0.116	0.420	0.086	4.856	0.000	0.000	107	1469
General Life Satisfaction	0.275	-0.076	0.351	0.080	4.377	0.000	0.000	107	1445
Domain satisfactions									
Health satisfaction	-0.017	-0.308	0.291	0.088	3.315	0.001	0.000	107	1477
Sleep satisfaction	0.191	-0.099	0.290	0.088	3.290	0.001	0.002	107	1477
Work satisfaction	-0.046	-0.189	0.143	0.096	1.484	0.138	0.166	107	1471
Income satisfaction	0.540	-0.011	0.551	0.108	5.099	0.000	0.000	107	1477
Leisure satisfaction	0.408	0.163	0.245	0.092	2.663	0.008	0.014	107	1476
Social satisfaction	0.116	-0.009	0.125	0.072	1.739	0.082	0.096	107	1476

Table 1: We report average treatment effects (ATE) in standard deviations for each aggregated dimension of well-being (averaged across waves 1-6 for purpose in life, averaged across general life satisfaction, domain satisfaction index, and waves 2-6 for life satisfaction, and averaged across WHO-5 depression scale, PSS scale, and waves 3-6 for mental health) and separately for the WHO-5 depression scale (averaged across waves 2-6), the PSS scale (across waves 1, 3-6), general life satisfaction (across waves 2-6), the domain satisfaction index (across waves 1-6), and the six individual domain satisfactions (across waves 1-6 for each one). Inference is based on robust standard errors (SE), and Neyman (N) and Fisher's exact (F) p-values. We reject the null of no effect for the aggregated mental health, purpose in life, and life satisfaction outcomes, the WHO-5 depression scale, the PSS stress scale, the domain satisfaction index, general life satisfaction, and health, sleep, income, and leisure satisfaction. We cannot reject the null for work and social satisfaction. All results are robust to multiple hypothesis adjustments, as we show in detail in the supplementary materials.

Outcomes and Analyses We make use of all questions on participants' mental health, purpose in life, and life satisfaction that were measured in the baseline survey and in the subsequent outcome surveys, to construct the outcomes that we use to assess the impact of the cash transfers. We consider outcomes at different levels of aggregation (across survey scales and waves). We consider both changes of outcomes relative to baseline values as well as levels of outcomes, and we normalize outcomes by their standard deviation at baseline. In the supplementary materials, we define all outcomes in detail.

Our analyses follow three preregistered steps. First, we estimate treatment effects by considering the strata-level difference in mean outcomes between the treatment group and control group, averaged across strata. Second, we determine statistical significance of treatment effects based on robust standard errors, and Neyman and Fisher's exact p-values[26] that account for stratified assignment. Third, we apply the Benjamini-Hochberg procedure[57] to adjust for multiple hypothesis testing, where this procedure allows us to control the false discovery rate: We rank hypotheses based on p-values, assign each hypothesis a threshold for p-values that increases with its rank and decreases in the total number of hypotheses, and we reject null hypotheses

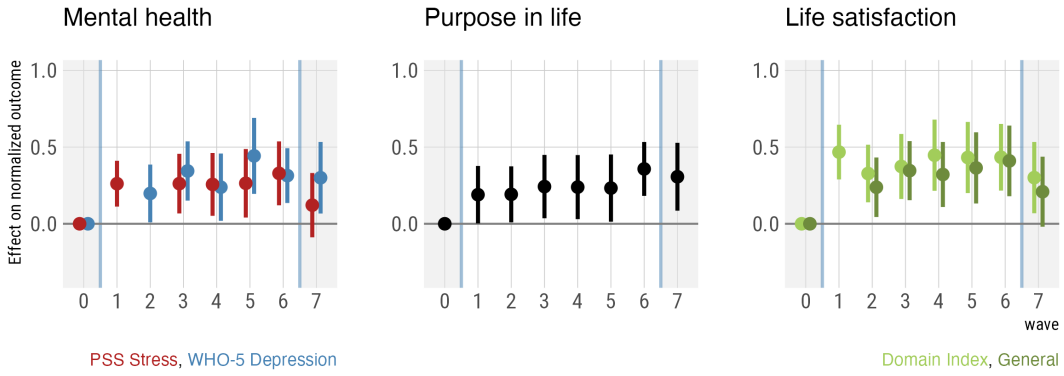

Figure 2: Treatment effects (in standard deviations) and 95% confidence intervals for outcomes in terms of changes by each wave. Differences in mean normalized outcomes between treatment and control for each stratum, averaged across strata, and adjusted for baseline outcomes. Due to the adjustment, there are no treatment differences at baseline.

based on these thresholds.

Main Results For our main results, we report the effect of treatment on *changes* of outcomes, relative to baseline values. Considering changes allows us to adjust for treatment-control imbalances of outcomes at baseline (wave 0), which remained despite stratification. In the supplementary materials, we report the results based on unadjusted outcomes.

To obtain summary estimates for each dimension of well-being during the entire study period, we estimate average treatment effects across waves (and scales for mental health and life satisfaction). We show these results in Table 1. Mental health improves by 0.347 standard deviations, purpose in life by 0.250 SD, and life satisfaction by 0.417 SD. Improvements in mental health are separately present for the WHO-5 depression scale (0.320 SD) and the PSS stress scale (0.279 SD). Improvements are also separately present for general life satisfaction (0.351 SD) and the domain satisfaction index (0.420 SD). Satisfaction with income improves by 0.551 SD, health by 0.291 SD, sleep by 0.290 SD, and leisure by 0.245 SD. All of these improvements correspond to statistically significant treatment effects, see Table 1. Social and work satisfaction also improve, respectively by 0.125 SD and 0.143 SD, these treatment effects are not statistically significant. However, these average treatment effects over time mask a delayed improvement in work satisfaction during the final three waves, see below. All results are robust to multiple hypothesis adjustments, as we show in the supplementary materials.

Longevity We study the longevity of treatment effects six months after the final cash transfer and report the findings in the supplementary material. While treatment effects reduce slightly in size six months after the final cash transfers, they retain, on average, 81% of their effect size during the cash transfer program. More precisely, cash transfers continue to significantly

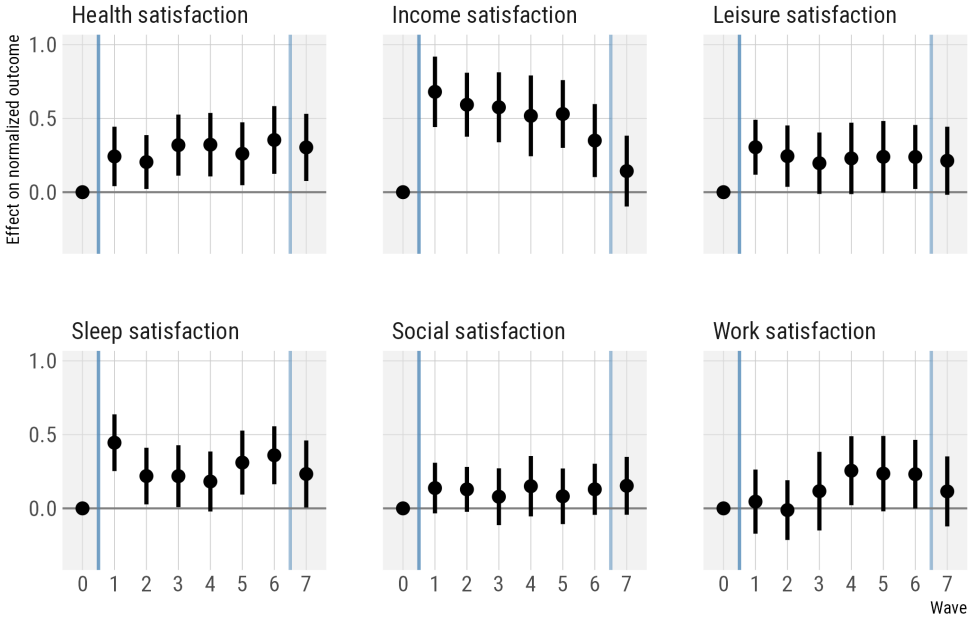

Figure 3: Treatment effects (in standard deviations) and 95% confidence intervals for all domain satisfactions separately in terms of changes by each wave. Differences in mean normalized outcomes between treatment and control for each stratum, averaged across strata, and adjusted for baseline outcomes. Due to the adjustment, there are no treatment differences at baseline.

improve mental health by 0.234 SD, purpose in life by 0.307 SD, and life satisfaction by 0.284 SD

Dynamics To study the dynamics of the well-being improvements, we display treatment effects separately for all waves and outcomes in Figures 2 and 3. As treatment effects are calculated by adjusting for baseline imbalances in outcomes, there are, by construction, no outcome differences at baseline. Figures 2 and 3 show that the improvements of most dimensions of well-being remain fairly constant over time. (i) The improvement in income satisfaction decreases over time. The significant and substantial effect of 0.680 SD six months into the cash transfer program reduces to a statistically insignificant effect of 0.143 SD six months after the cash transfer program finished. (ii) While we find no treatment effect on work satisfaction during the first one and half years (0.050 SD, not significant), cash transfers significantly improve work satisfaction during the final one and half years of the cash transfer program (0.241 SD).

Mechanisms

Agency and life changes In explorative analysis, we present evidence that cash transfers empower recipients to implement and experience meaningful life changes. These analyses are based on recipients' retrospective accounts of their experiences with the cash transfers, treatment effects on participants' self-reported household finance data, treatment effects on participants' time use data, and treatment effects on participants' perceived autonomy. Five pattern emerge that directly relate to drivers of mental health and wellbeing discussed in the literature. We hence view these patterns to provide evidence on the mechanisms behind the mental health and wellbeing improvements that we documented in the previous section. The five patterns are:

(i) According to recipients' own accounts of their experience with the cash transfers, and according to positive treatment effects on participants' saving behavior, the cash transfers improved the financial security of recipients. The corresponding literature identifies financial security to be a foundation for mental health and wellbeing.[29,30]

(ii) Recipients state, and positive treatment effects on participants' charitable giving and financial support of family and friends show that the cash transfers increased recipients' prosocial behavior. There is ample evidence that spending money on others improves wellbeing.[31,32]

(iii) Cash transfers increase the time participants spend with their friends. The related literature finds that a richer social life and less loneliness are cornerstones of good mental health and wellbeing.[33,34,35]

(iv) Cash transfers tend to increase participants' sleeping time and their spending on leisure activities and traveling. Evidence from a meta-analyses show that better sleep[36] and better recreational activities[37] improve mental health and wellbeing.

(v) Recipients state, and treatment effects on perceived autonomy show that cash transfers improved participants' perceived agency and control over their lives. Correspondingly, ample evidence suggests that autonomy and freedom of choice are important prerequisites for wellbeing.[38,39]

In the following, we present the results behind patterns (i)-(v) more thoroughly.

Retrospective accounts of treated participants In the very end of the survey in wave 6, that is at the end of the cash transfer program, we asked cash transfer recipients in a free form question to retrospectively reflect on how the cash transfers impacted them. By making use of a free form question, we avoid anchoring participants' responses on specifics aspect chosen by researchers.[58] Instead, participants freely chose to write about what they deemed to be of relevance.

We asked three RAs to independently analyse participants' text responses and indicate for each response whether it mentions one or multiple of the following categories: Financial security, freedom/autonomy, wellbeing, cash transfers had no effect, changes in education, changes in work, changes in leisure activities, changes in health, changes in sleep, changes in social relationships, changes in romantic partnerships, and changes in donations and financial support of

others.

We find that 72% of treated participants mentioned that their financial security improved, and 67% mentioned that the cash transfers changed their lives. Regarding life changes, 37% treated participants mentioned their work and education, 38% leisure activities, and 63% donations and financial support of others. Relatedly, 25% of treated participants explicitly stated greater freedom of choice. Only 8% of treated participants stated that the cash transfers had no impact on their lives.

These findings support the patterns (i) and (v) documented above by showing, respectively, that a substantial share of treated participants directly mentioned to experience/have experienced financial security and that a large share of treated participants mention specific life changes and some participants event mentioned increased freedom of choice abstractly.

Household finance All surveys included questions on monthly saving, biannual donations, biannual financial transfers given to family and friends in the past six months, current debt, and current assets, and the surveys of wave 3-6 also included questions on monthly spending on housing, energy costs, appliances, daily uses, mobility, leisure activities, apparel (clothes and shoes), and travel. The wording of these questions, and all other questions discussed below, is stated in the supplementary materials.

We report treatment effects on these outcomes, in levels and changes (when possible), averaged across waves in the upper half of Tables 2. We find positive and statistically significant treatment effects on participants' monthly saving (both in changes and in levels), donations (both in changes and in levels), transfers to family and friends (both in changes and in levels), total assets (both in changes and in levels), spending on apparel, travel and leisure activities. We do not find significant treatment differences on participants' debt (neither in changes nor in levels), spending on housing, energy costs, mobility, appliances, and daily uses.

We first turn in more detail to the treatment effect on monthly saving. While participants in the control saved on average EUR 332 on a monthly basis during the cash-transfer program, treated participants' monthly saving was EUR 779, that is EUR 447 greater than in the control. Accounting for baseline difference, the treatment effect amounts to EUR 455. Overall, treated participants saved more than one third of their monthly cash transfer during the cash transfer program. At the same time, we find no treatment effect on participants' debt. And, we find that the share of participants with assets less than EUR 10.000 at the end of the cash transfer program decreases significantly by 14pp due to the cash transfers (with Neyman and Fisher's exact P-value<0.01). Consequently, the results suggest that the cash transfers allowed treated participants to expand their financial security, which supports pattern (i) reported above.

We next turn to the treatment effects on donations and financial support of family and friends. Control participants donated to charitable causes and financially supported their family and friends with, on average, EUR 62 per month. The cash transfers impacted prosocial giving of treated participants substantially during the program, increasing the sum of donations and financial support to family and friends by EUR 92.5 to overall EUR 154.5 per month. Accounting

Outcome	Treated	Control	ATE	SE	t-stat	p-val (N)	p-val (F)	n treated	n control
Financial household									
Donations (biannual), changes	71.162	-24.719	95.881	20.014	4.791	0.000	0.000	107	1475
Transfers (biannual), changes	388.759	-50.737	439.497	128.023	3.433	0.001	0.004	107	1474
Savings (monthly), changes	494.698	39.217	455.481	41.966	10.854	0.000	0.000	107	1473
Debt (stock), changes	4065.681	4257.961	-192.279	3500.340	-0.055	0.956	0.958	107	1474
Donations (biannual), levels	170.310	73.105	97.205	27.822	3.494	0.000	0.018	107	1475
Transfers (biannual), levels	757.156	299.882	457.274	117.067	3.906	0.000	0.006	107	1474
Savings (monthly), levels	779.251	332.175	447.076	44.996	9.936	0.000	0.000	107	1473
Debt (stock), levels	14137.688	13703.791	433.897	3812.833	0.114	0.909	0.898	107	1474
Monthly spending									
Appliances, levels	421.294	496.737	-75.443	91.439	-0.825	0.409	0.410	107	1419
Daily needs, levels	340.421	327.582	12.838	15.498	0.828	0.407	0.414	107	1419
Apparel, levels	145.082	112.143	32.939	11.425	2.883	0.004	0.006	107	1419
Leisure, levels	184.168	147.135	37.033	13.971	2.651	0.008	0.010	107	1419
Mobility, levels	170.999	151.970	19.029	12.627	1.507	0.132	0.136	107	1419
Travel, levels	436.628	248.402	188.227	81.013	2.323	0.020	0.032	107	1419
Housing, levels	642.378	647.918	-5.540	32.441	-0.171	0.864	0.866	107	1419
Energy, levels	127.259	125.587	1.672	15.697	0.107	0.915	0.910	107	1419
Time use, hours per week									
Chores, changes	0.397	-0.691	1.087	0.365	2.983	0.003	0.002	107	1465
Education, changes	-0.451	-1.606	1.155	0.691	1.673	0.094	0.104	107	1465
Entertainment, changes	-2.318	-2.423	0.105	1.052	0.100	0.920	0.942	107	1465
Family, changes	1.050	0.050	1.000	0.634	1.576	0.115	0.112	107	1465
Friends, changes	1.322	-0.710	2.031	0.539	3.768	0.000	0.000	107	1465
Partner, changes	2.668	0.802	1.866	1.444	1.292	0.196	0.192	107	1465
Sleep, changes	1.018	-1.520	2.539	0.793	3.202	0.001	0.002	107	1465
Sport, changes	-0.690	-0.167	-0.523	0.296	-1.766	0.077	0.106	107	1465
Volunteering, changes	0.114	-0.153	0.267	0.222	1.202	0.229	0.204	107	1465
Chores, levels	7.241	7.305	-0.064	0.357	-0.179	0.858	0.868	107	1465
Education, levels	4.497	4.193	0.305	0.582	0.524	0.601	0.616	107	1465
Entertainment, levels	17.805	18.089	-0.284	0.958	-0.296	0.767	0.760	107	1465
Family, levels	6.806	6.056	0.750	0.718	1.045	0.296	0.314	107	1465
Friends, levels	9.834	8.512	1.322	0.538	2.457	0.014	0.016	107	1465
Partner, levels	13.491	11.766	1.724	1.449	1.190	0.234	0.274	107	1465
Sleep, levels	49.102	47.867	1.235	0.884	1.396	0.163	0.176	107	1465
Sport, levels	3.922	3.782	0.140	0.330	0.425	0.671	0.674	107	1465
Volunteering, levels	1.327	0.949	0.378	0.261	1.451	0.147	0.166	107	1465
Autonomy									
Perceived autonomy, levels	4.024	3.706	0.320	0.065	3.824	0.000	0.000	107	1477

Table 2: We report average treatment effects (ATE) in standard deviations for household finance variables, time use variables, and autonomy; both in levels and changes when possible. Inference is based on robust standard errors (SE), and Neyman (N) and Fisher's exact (F) p-values.

for baseline difference, the treatment effects amount to EUR 89 greater prosocial giving per month. Consequently, treated participants shared 7-8% of their monthly cash transfer with others. These results support pattern (ii) reported above.

Because of limited survey length, we did not cover participants' consumption rigorously. Based on questions intended to provide a broad overview of consumption, however, we find that treated participants spend on average EUR 33 per month more on clothes and shoes, EUR 37 per month more on leisure activities, and EUR 188 per month more on travelling. The latter two treatment effects are in sum EUR 225, roughly 19% of the monthly cash transfers, and suggest that the cash transfers allowed treated participants to have a more active life, supporting pattern (iv) reported above.

Time use In waves 0-3 and 5, we surveyed participants' time use (in hours per week) on chores, education, entertainment, family, friends, partner, sleep, sport, and volunteering. We report treatment effects on these outcomes, in levels and changes, averaged across waves in the lower half of Tables 2.

We find positive treatment effects on time spent with friends (both in changes and levels). While the control group spent, on average, roughly 8.6 hours with friends per week, treated participants spent 1.3 hours more time with friends per week, an increase of 15%. Accounting for baseline differences, the treatment effect increases to slightly more than 2 hours more time with friends per week. These results support pattern (iii) stated above.

We also find a positive treatment effects on participants' sleeping time when considering changes relative to the baseline. According this estimated treatment effect, treated participants sleep longer for 2.3 hours per week relative to control participants. On a nightly basis, this amounts to roughly 20 minutes longer sleep. Consistent with this finding, treated participants report greater sleep satisfaction, an important mediator for the positive effects on longer sleep on greater mental health and wellbeing[36]. While these treatment effects support pattern (iv) reported above, we do not find a statistically significant treatment effect on sleeping time in levels. According to this insignificant estimate, treated participants slept "only" 1.2 hours longer per week than control participants.

Perceived autonomy Starting in wave 1, we elicited participants perceived autonomy in each wave. We asked participants how autonomous they feel in their own life. We report the treatment effect on this outcome in levels in the final row of Tables 2 and display the dynamics of the treatment effects over time in Figure 4. We find that cash transfers improve perceived autonomy by 0.320 SD on average across waves. Consistent with participants' retrospective accounts on live changes and greater freedom of choice, and consistent with the positive treatment effects on participants' spending and time use, this finding suggests that participants experienced greater agency, allowing them to shape their lives in greater extends according to their values and needs. This treatment effect hence supports pattern (v) documented above.

Discussion

The Effect of Cash-Transfers on Subjective Well-Being The literature on cash transfers in low and mid-income countries finds that cash transfers allow to improve recipients' mental health and well-being.[11,48,51] A recent meta study reports modest improvements in mental health of 0.07 SD and in life satisfaction of 0.13 SD.[52] Prominent authors have argued that there is a smaller scope of well-being improvements in richer countries,[23,6,42,43] where basic needs tend to be satisfied, comparatively generous social benefit programs are in place, and adaption and satiation effects limit well-being improvements, as material goals rise with income gains.[42,43] Indeed the contemporaneous literature on cash transfers in high-income countries finds no evidence for durable improvements in subjective well-being.[16,59,17,18,19,20]

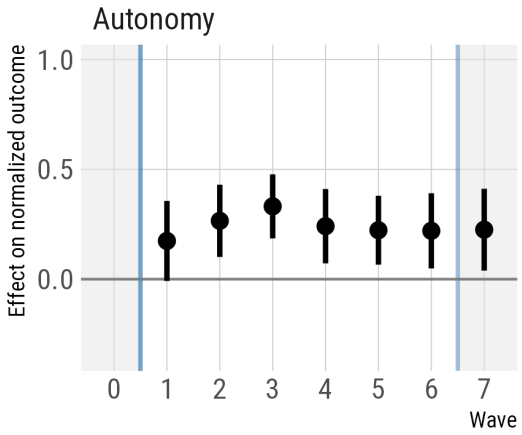

Figure 4: Treatment effects and 95% confidence intervals for perceived autonomy in each wave. Difference in mean normalized outcome between treatment and control for each stratum, averaged across strata.

We contribute to this literature by showing that cash transfers can lead to large, durable improvements in well-being. Our findings suggest that cash transfers need to be large enough to cause durable well-being improvements. Among evaluations by other research teams, the most generous is a contemporaneous cash transfer RCT in the US that paid USD 1,000 on a monthly basis for three years.[18,19,20] Recipients were households with, on average, three members. This cash transfer increased average household income by 40% during the treatment period of three years. In our setup, by contrast, recipients received EUR 1,200 on a monthly basis for three years to *single member* households. Our cash transfer increased household income by 46-110% (on average 61%). We conjecture that it is critical that cash transfers empower recipients to make meaningful changes in their lives, in order to enable them to sustain well-being improvements.

The following observations support this interpretation. Our findings on mental health and well-being improvements are accompanied by the following additional patterns: (i) Cash transfers recipients state to feel greater financial security and their self-reported household finance data suggests that they saved one third of their monthly cash transfers for the future. (ii) Treated participants shared seven to eight percent of their cash transfers with others, in the form of financial support to family and friends and charitable giving. (iii) Cash transfers allowed recipients to spent 1.3 hours per week more time with their friends. (iv) Treated participants tended to sleep longer (between 1.2 and 2.3 hours per week) and invested more in recreational activities. (v) Cash transfers improved the perceived autonomy of participants, allowing them experience greater control to live according to their values and needs. Importantly, the vast

literature present ample evidence that mental health and well-being benefit from greater financial security[29,30], prosocial behavior[31,32], social connectedness[33,34,35], sleep and recreational activities[36,37], and autonomy[38,39]. We hence view the five patterns mentioned above to provide evidence on the mechanisms behind the mental health and well-being improvements. Importantly, the cash transfer RCT in the US did not find that cash transfers have equivalent effects on their recipients.[18,19,20] Instead, they report much smaller effects on monthly savings, donations, and financial support to others, and they do not find positive effects on time spent with friends and sleeping time. We hence conclude that cash transfers need to be generous enough to empower recipients to implement and experience the changes in their lives that lead to enduring mental health and well-being improvements.

Lottery Winnings versus Basic Income We also contribute to the literature on whether money more generally improves well-being in high-income countries. Much of this literature relies on lottery winnings to estimate the causal effects.[41,44,46,47,49,53] The reported findings are mixed: mental health is found to be affected positively[41,46], not at all[49] or, potentially even, negatively[47]; life satisfaction is reported to be affected positively[46,49,53], or not at all[44]. For instance, large lottery winnings of USD 100,000 or more in Sweden do not improve mental health and improve long-term life satisfaction by merely 0.034 SD for every USD 100,000 of winning.[49]

Our results suggest that generous, regular, unconditional, and guaranteed cash transfers may be particularly well-suited to improve well-being. Guaranteed and regular cash transfers that continue into the future enhance the predictability of financial security, help to sustain reasonable spending habits, and limit potential stress and anxiety related to the management of large lump sum payments. They appear to limit adaptation and satiation effects, potentially by providing continual reminders and positive reinforcement of financial security.

Autonomy and Well-Being Improvements Regular, unconditional, and guaranteed cash transfers ease financial constraints. As a result, recipients may find themselves with more freedom to shape their lives according to their tastes, values, and psychological needs.[60] In turn, they may attribute this increased sense of control to their own autonomous disposition, rather than to changes in circumstances.[61] While previous work shows that the correlation between perceived autonomy and life satisfaction is often greater in richer than in poorer countries,[38] we add more direct evidence on the link between autonomy and well-being improvements.

Stability of Well-Being Improvements Our findings imply relatively stable well-being improvements. Previous research, mostly based on correlational evidence, suggests otherwise: Models of adaptation effects posit that, as people get used to greater income, well-being improvements attenuate[45]. Models of satiation effects, relatedly, suggest that well-being improvements due to income gains are less pronounced, the more income is already available[42,43]. While we do find some evidence for adaptation effects on income satisfaction, we find no evidence for adaptation effects in mental health, purpose in life, and in the other domains of life satisfaction,

consistent with more recent correlational evidence against adaptation effects[62,63]. This suggests that well-being improvements may be more stable than *previously* thought.

Experimenter Demand and Hawthorne Effects The internal validity of experiments with human participants may, in principle, suffer from experimenter demand and Hawthorne effects.[27,28] If there are demand effects, treated participants might report greater well-being to lend support to basic income policies more generally. If our findings are due to Hawthorne effects, participants change their behavior only because they are experimentally observed.

The following observations suggests that experimenter demand and Hawthorne effects do not account for our findings. First, we find no treatment effect on participants' political support for basic income policies, as discussed in the supplementary material. This contradicts explanations based on experimenter demand, where recipients try to give answers that lend support to basic income policies. Second, the dynamics over time of treatment effects on subjective well-being are not consistent with demand and Hawthorne effects, either. Demand and Hawthorne effects cannot explain the decreasing treatment effect on income satisfaction over time, nor the increasing treatment effects on purpose in life and work satisfaction. Instead, these patterns suggest that income satisfaction is subject to adaptation[42,43,45], while effects on purpose in life and work satisfaction are delayed because they require live changes that take time. Third, our experimental design limits the potential roles of demand and Hawthorne effects. To limit demand effects, we explicitly asked participants to respond accurately to factual questions, stated that there are no right or wrong answers to subjective questions, and used a third-party survey company to implement our surveys. Regarding Hawthorne effects, treated and control participants are observed to the same extent. This makes explanations of our findings based on Hawthorne effects, where outcomes are moved by observation rather than treatment, implausible.

Generalizability The cash transfer program covered in our RCT is resource intensive, costing in total EUR 4.6 million. The size of the treatment group is hence limited, so that we cannot study general equilibrium effects. Our results are furthermore based on a non-representative sample, which potentially limits generalizability. Our effect sizes may also not generalize to settings where cash transfer is either less or more generous. And cash transfers might in practice be combined with other policy changes, such as increases of taxation to finance the basic income. The impact of such additional policy changes needs to be taken into account when assessing the normative desirability of cash transfer policies.

Conclusion

We show that generous, regular, unconditional, and guaranteed cash transfers improve recipients' mental health, purpose in life, and life satisfaction. Understanding how public policies can improve subjective well-being matters from the perspective of public health, where it has been argued that *there is no health without mental health*[64]. Mental health and purpose in life

affect the extent to which individuals cope with the stresses of life, realize their abilities, learn well and work well, and contribute to their community[21] and perceive themselves to be fully functioning[22,23].

Our study also has implications for debates about optimal policy. The field of optimal tax and transfer theory in economics[65,66,67] analyzes the tradeoffs involved in the choice of transfer policies such as basic income, that have to be financed by raising progressive income taxes, or by some other form of taxation. These tradeoffs involve the benefits of a transfer policy, to which the present paper speaks; we have shown that sufficiently generous, unconditional, regular and guaranteed transfers can have large positive effects. These tradeoffs also involve the costs of a transfer, which depend in particular on the extent to which the tax base is affected via labor supply responses to the policy. We will explore these questions of labor market effects and optimal policy design in greater detail in a follow-up paper, drawing on administrative labor market data.

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